

**REMARKS/ARGUMENTS**

Status of Application

Claims 1-42 and 55 are pending. Claims 1-19, 21-39, and 48 were rejected on the basis of prior art, double-patenting, and/or formal deficiencies. Applicant gratefully acknowledges the indicated allowability of claims 20 and 40-42.

Summary of Rejections and Amendments

Formal Objections. Claims 23 and 48 were objected to because of informalities. Applicant has amended claim 23 so that it ends in a period rather than a semicolon. Applicant has canceled claim 48, which was intended to depend from claim 43. Claim 43 was withdrawn and is now canceled.

Indefiniteness Rejection. Claims 30-38 were rejected for indefiniteness. Applicant has amended claim 30 so that it now depends from claim 29 (as was originally intended) rather than claim 1. Claim 29 recites all the elements that are needed to provide antecedent basis for dependent claims 30-38. Applicant has further amended these claims to the extent necessary for consistency with the amendments to claim 29.

Rejection over Takase. Claims 1, 3, 5, and 19 were rejected as anticipated by U.S. Patent No. 5,138,159 to Takase et al. (Takase). Applicant has amended claim 1 to distinguish over Takase. Applicant has also added claim 55 that is believed to distinguish over Takase.

Rejection over Muramatsu. Claims 1, 2, 4, and 9 were rejected as anticipated by U.S. Patent No. 6,229,609 to Muramatsu et al. (Muramatsu). Applicant is swearing behind Muramatsu, and is submitting herewith a Declaration Under 37 C.F.R. § 1.131 ("Rule 131 Declaration").

Rejection over Theodore. Claim 29 has been rejected as anticipated by U.S. Patent No. 5,338,932 to Theodore et al. (Theodore). Applicant will present reasons that Theodore does not anticipate claim 29 or render it obvious. Applicant has amended claim 29 so that it is no longer substantially identical to a claim in an issued patent.

Obviousness Rejections. Claims 6-8, 10-12, 14-18, and 48 were rejected for obviousness over Takase. Claims 30-38 have been rejected for obviousness over Takase in view of Theodore. Claim 39 has been rejected for obviousness over Theodore in view of. Muramatsu. Applicant believes that the claims would not have been obvious over the above-mentioned references for the reasons summarized above and set forth in detail below with respect to the cited references in connection with the anticipation rejections.

Double-Patenting Rejections. Claim 29 was rejected for same-invention double patenting in view of claim 24 of Applicant's U.S. Patent No. 6,265,711. Applicant has amended claim 29 to differentiate it from claim 24 of the '711 patent. Claims 1-3, 5, and 21-28 were rejected for obviousness-type double patenting in view of claim 5-7, 14-20, and 22 of Applicant's '711 patent. Applicant respectfully requests that the requirement to file a Terminal Disclaimer be deferred until the claims that are subject to the double-patenting rejections have been indicated otherwise allowable over the prior art.

Rejection over Takase

Anticipation by Takase

Claims 1, 3, 5, and 19 were rejected as anticipated by Takase. Takase shows a scanning tunneling microscope (STM) used in conjunction with a "spectroscope" which Applicant will acknowledge is a spectrometer or a spectrophotometer.

Applicant has amended claim 1 to distinguish over Takase. In particular, claim 1 has been amended to recite that the non-optical interaction is "other than a tunneling current between said tip and said object." For example, the specification at page 7, lines 7-11, reads as follows:

As a result, the cantilever 130 will be deflected due to a non-optical interaction in the form of a atomic force interaction between the tip 132 and the object 104. As those skilled in the art know, this atomic force interaction may be due to Van der Waals forces, magnetic forces, electrostatic forces, lateral forces, or other related forces.

Additionally, as stated at page 6, lines 1 and 2, "Figure 37 shows an atomic force microscope probe sensing an acoustic wave in accordance with the present invention."

Claim 1, as amended, recites both an optical interaction and a non-optical interaction that is other than a tunneling current interaction. Accordingly, claim 1 contemplates non-optical interactions such as a Van der Waals force interaction, a magnetic force interaction, an electrostatic force interaction, a lateral force interaction, and an acoustic force interaction, and new dependent claim 55 explicitly recites these as possibilities. Therefore, claim 1, as amended, is respectfully submitted to be patentable over the art.

Dependent claim 3 recites, in addition to the optical and non-optical interactions, a tunneling current interaction.

Applicant respectfully disagrees with the Examiner's statement (with respect to claim 19) that Takase discloses a light emissive coating on the tip. The Examiner's reasoning is that "since the light passes through the transparent coating, light is emissive from it." Applicant submits that an "emissive layer" has the property that it emits light rather than merely transmitting light. There is no suggestion in Takase that any of the coatings are emissive. Therefore, claim 19, as amended to be in independent form, is respectfully submitted to be patentable over the art.

#### Obviousness over Takase

Claims 6-8, 10-12, 14-18, and 48 were rejected as obvious over Takase. For the reasons stated above in connection with claim 1, Applicant submits that the obviousness rejection is overcome. However, Applicant respectfully disagrees with the Examiner's characterization of the tip materials of claims 14-18 as being matters of routine skill. Nevertheless, in view of the amendment to claim 1, there is no need to pursue the discussion with respect to claims 14-18, which incorporate all the limitations of amended claim 1.

#### Rejection over Muramatsu

Claims 1, 2, 4, and 9 were rejected as anticipated by U.S. Patent No. 6,229,609 to Muramatsu et al. (Muramatsu). Applicant is swearing behind Muramatsu.

Double Patenting Rejection

Claim 29 has been rejected for same-invention double patenting over claim 24 in Applicant's U.S. Patent No. 6,265,711. Applicant has amended claim 29 so that it now recites a method rather than apparatus. This is believed to differentiate amended claim 29 from claim 24 of U.S. Patent No. 6,265,711. While dependent claims 25-31 of U.S. Patent No. 6,265,711 were not specifically mentioned, Applicant believes that the amendment to claim 29 in this application addresses any same-invention double-patenting issues any of those claims might be considered to present.

Rejection over Theodore

Claim 29 has also been rejected as anticipated by Theodore. Dependent claims 30-38 have been rejected for obviousness over Takase in view of Theodore.

The invention of claims 29-42 differs significantly from the teachings of Theodore, as will now be discussed. The distinction may be put simply as follows:

- The present invention holds the normally flexible cantilever rigid relative to the base so that the probe tip is incapable of movement relative to the base, thereby allowing STM to be performed.
- Theodore increases the rigidity of the cantilever in an attempt to reduce the relative movement of the tip and the base to a sufficiently low level to perform STM.

These are completely different approaches, although Theodore's states an ideal of making the cantilever infinitely rigid. However, his teachings fail to describe any way to achieve this goal.

Consider first Theodore's embodiment of FIG. 1, wherein a force element 15 is disposed about halfway along the cantilever, in effect superimposing an additional spring force at the center of cantilever beam 12. Assume for the sake of argument, even though that is not suggested, that the force element could hold the center of cantilever 12 rigid relative to support member 13 (the base). Since the stiffness of a simple cantilever varies as the cube of the thickness and square of the length, the distal half of the cantilever would still have a flexibility on the order of 25 percent that of the full length cantilever. This is a far cry from holding the cantilever rigid relative to the base.

Consider next Theodore's embodiment of FIG. 3, where a piezoelectric actuator 21 is attached to the top surface of cantilever 12. When a force voltage applied to element 21 by a pair of electrodes 22 and 23 is increased, element 21 expands thereby applying a downward force on element 12. It is difficult to understand how this arrangement could provide a significant change in stiffness, since known piezoelectric materials would normally undergo a displacement of much less than 0.01 percent of their length. There is no suggestion that the piezoelectric material would undergo a change in its inherent stiffness as a result of the electric field, nor is such an effect known.

The word "rigid" has two meanings, which while related, underscore the distinction in this case. As defined in Random House Webster's Unabridged Dictionary, "rigid" means:

**rig·id** (rij·Ēid), *adj.*

1. stiff or unyielding; not pliant or flexible; hard: *a rigid strip of metal.*
2. firmly fixed or set.
3. inflexible, strict, or severe: *a rigid disciplinarian; rigid rules of social behavior.*
4. exacting; thorough; rigorous: *a rigid examination.*
5. so as to meet precise standards; stringent: *lenses ground to rigid specifications.*
6. *Mech.* of, pertaining to, or noting a body in which the distance between any pair of points remains fixed under all forces; having infinite values for its shear modulus, bulk modulus, and Young's modulus.
7. *Aeron.*
  - a. (of an airship or dirigible) having a form maintained by a stiff, unyielding structure contained within the envelope.
  - b. pertaining to a helicopter rotor that is held fixedly at its root.

[1530–40; < L *rigidus*, equiv. to *rig(re)* to be stiff, stiffen + *-idus* -ID<sup>4</sup>]

—**ri·gid·Ēi·ty**, **rig·Ēid·ness**, *n.*

—**rig·Ēid·ly**, *adv.*

—**Syn.** 1. unbending, firm, inflexible. 2. immovable, static. 3. austere, stern, unyielding. See **strict**. 4, 5. demanding.

—**Ant.** 1. elastic. 3. lax.

In the present invention, the "holding means for holding said cantilever rigid with respect to said base during said tunneling current mode" uses the term "rigid" in the second sense, and all the disclosed structures perform the holding function to that end. Theodore, on the other hand, uses the term in the first sense, and seeks to make the cantilever stiff. Setting aside the technical

issues with Theodore's approach, it is a completely different approach than holding the cantilever.

Accordingly, claim 29, even prior to amendment, is patentable over Theodore, and the anticipation rejection should be withdrawn. As mentioned above, Applicant has amended claim 29 and its dependent claims 30-39 to recite a method, but has maintained much of the actual claim wording intact.

Applicant's Showing of Prior Invention is Sufficient to Remove Muramatsu as a Reference  
Claim 1 is entitled to the priority of App. No. 08/281,883, filed July 28, 1994

This application and the application giving rise to U.S. Patent No. 6,265,711 ("the 711 patent") claim priority one way or another to U.S. Patent Application No. 08/281,883, filed July 28, 1994, now abandoned ("the '883 application").

Further, the claims at issue with respect to Muramatsu are entitled to the priority of the '883 application. In particular, the '711 patent issued from U.S. Patent Application No. 08/906,602, filed December 10, 1996, which is a file wrapper continuation of the '883 application. The present application is a continuation of U.S. Patent Application No. 08/776,361, filed May 16, 1997, now U.S. Patent No. 6,339,217, issued January 15, 2002, which is a National Phase filing of PCT Application No. PCT/US95/09553, filed July 28, 1995 (Pub. WO 96/03641), which is a continuation-in-part of the '883 application.

Applicant Made His Invention Before April 11, 1994, Muramatsu's §102(e)/103 Date

Applicant submits, with this Amendment, a Rule 131 Declaration setting forth facts showing conception of the invention of claim 1 prior to April 11, 1994, the U.S. filing date of Muramatsu, followed by continuous diligence through the filing of the '883 application on July 28, 1994.

Applicant respectfully submits that the Declaration sets forth sufficient facts to prove conception before the U.S. filing date of Muramatsu and continuous diligence from before Muramatsu's filing date to the filing date of the '883 application, and thus to remove Muramatsu as a reference.

Appl. No. 10/047,454  
Amdt. dated July 7, 2003  
Reply to Office Action of January 7, 2003

PATENT

CONCLUSION

In view of the foregoing, Applicant believes all claims now pending in this Application are in condition for allowance, subject to the filing of a Terminal Disclaimer upon the notification that the claims are otherwise allowable. Such notification at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,

A handwritten signature in black ink that reads "David Slone" with a long, sweeping horizontal stroke extending to the right.

David N. Slone  
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